Biomass Program

Integration of Succinic Acid Production in a Dry Mill Ethanol Facility

Production cost and overall risk are major barriers in developing a biorefinery. This project seeks to address both issues for a dry mill ethanol biorefinery by lowering the cost of sugars with the development of an advanced pretreatment process, improving the economics of succinic acid (SA), and developing a model of an ethanol dry mill to evaluate the impact of adding different products and processes to a dry mill.

The pretreatment technology under development is an ammonia fiber explosion (AFEX) process. AFEX will maximize the sugar yield from biomass without the by-products that inhibit downstream processing. The use of enzymes to breakdown the resulting sugar polymers to simple sugars will be minimized, lowering overall sugar production costs.

Succinic acid is a chemical with the potential to be converted to a multitude of valuable products, including maleic anhydride. The production cost of SA will be reduced through optimized processing and an improved fermentation organism.

Lab-scale succinic acid fermentation

R&D Pathway

Researchers will demonstrate the AFEX pretreatment process with corn fiber and switchgrass and address enzyme recovery and re-use and sugar separation and purification methodologies. They will also optimize the batch SA process and investigate the potential of a two-stage process, develop a combined neutralization and recovery process at lab-scale, and develop an acid-tolerant SA production strain.

Lastly, they will create an economic model for the AFEX process and a new dry mill ethanol model, and evaluate existing (xylitol) and new technologies to be profitably integrated into ethanol dry mills.

Congressionally Directed Bioproducts R&D

Benefits

- **Reduce cost of biomass sugars**
- **Lower production cost of succinic acid**
- **Enable cost-effective integration of bioproducts into ethanol plants**

Applications

The project will help drive the viability of sugar biorefineries by reducing production costs and risks involved in upgrading an ethanol dry mill to a biorefinery.

Project Partners

Bolak and Company
CTI
Frasier-Barnes
Heartland Grain Fuels
MBI International
National Renewable Energy Lab
USDA-Agricultural Research Service

Project Period

FY 2003 – FY 2007

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Visit the Web site for the Office of the Biomass Program (OBP) at
www.eere.energy.gov/biomass.html

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